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## **Effect of Debt Ratio on Earnings Per Share of Listed Manufacturing Firms in Nigeria**

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### **ABSTRACT**

This study assessed the effect of Debt Ratio on Earnings Per Share of listed Manufacturing Firms in Nigeria. Earnings Per Share was used to measure Shareholders Wealth Creation. Based on the objectives of the study, five hypotheses were formulated. *Ex-Post facto* research design was adopted. Twenty one (21) listed manufacturing companies constituted the sample size of this study between 2010 and 2020. Secondary data were extracted from the annual reports and accounts of the sampled firms and were analyzed using E-Views 10 statistical software. The study employed descriptive statistics and inferential statistics. Panel Least Square (PLS) regression analysis and Hausman test was used to test the Hypothesis. Findings from the empirical analysis showed that a significant and positive relationship exists between Debt Ratio and Earnings Per Share. It is recommended inter alia that firms should adopt low cost operation strategies that limit borrowing; this will enable firms to avoid over dependence on debt

**Keywords:** Debt Ratio, Earnings Per Share and Manufacturing firms

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### **INTRODUCTION**

Debt financing is a key element in a firm's choice of its capital structure. By generating revenues that would not have been reached without additional funding, external financing in the form of debt or equity capital allows firms to increase firm value, which is traditionally considered an ultimate goal of any business. The origin of debt financing can be dated as far back as the middle ages when money lending services were made accessible to traders from the city of Venice. This was followed by the emergence of international banking in the 18th century, led by the Rothschild family. Fast forward to the 1980s, the internet was introduced into debt financing procedures, with Quicken Loans processing loan applications online for the first time.

Debt financing instruments, like bonds, ease the pressure on bank lending, particularly longer-term lending, and allow a wider range of corporate credits to access investment markets and seek more finance than the banks or government agencies could provide. Debt financing takes many forms. The essence of debt is that the borrower will repay the funds along with agreed-upon service charges such as interest and loan origination fees. If the money is not repaid as promised, the lender can start collection proceedings. This process can become very uncomfortable for the entrepreneur, who could stand to lose the business and any non-business assets pledged to secure the loan. A long-term loan usually has a payback period between one to five years. Depending upon the deal negotiated, these loans are normally secured (collateralized by assets) and guaranteed by the entrepreneurs. Rates and terms on long-term loans vary greatly based on the lending institution's policies and the business's age and financial status (Liljebloom & Maury, 2016).

Surveys of empirical studies revealed that consensus have not been reached on the relationship between debts ratio on earnings per share. Many studies reported a significant negative relationship between debt financing and performance. For instance, Orji, Nwadiakor and Agubata (2021) examined the effect of Debt Financing on Performance of Firms in Nigeria using OLS Regression Model. The findings of the study showed that Debt Financing has significant and positive effect on Firms Performance. Kućera, Vochozka and Rowland (2021) determined the optimal credit absorption capacity of enterprises in Austria. The linear regression analysis found a negative relationship between leverage and performance of enterprises. Most of the previous studies were focused on financial sector. This present therefore, considering the manufacturing firms as against the prior studies that focused on service and financial sector. It is therefore, imperative to evaluate the effect of debt ratio on earnings per share of listed manufacturing firms in Nigeria.

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### **REVIEW OF RELATED LITERATURE**

Shareholders wealth maximisation hypothesized that the immediate financial objective and crucial aim of public corporations is and should be to maximize returns to shareholders (Panigrahi, 2017). In an organized capital market setting, the general assumptions and corporate objective of companies had always been for the companies to strive to create and grow shareholders' wealth, as no company would economically and stably exist if it failed to create

sufficient wealth for the shareholders, unfortunately, managers of corporate organizations regrettably in undertaking of this corporate objective, pursue their own interests. Firm's calibrate its debt option for financing its operations by issuing bonds to the general public having the specific prescribed interest rate or taking loan from the banks in the form of notes payable which classified as long-term debt, another option to finance firm's operations is from equity source by issuing common stocks and preferred stocks to the general public. In order to finance firm's overall operations and growth by financing its assets from various sources is dependent upon capital structure of the firm (Aguguom & Salawu, 2018). Debt and Equity is the main financing options used by all the firms. For the purpose of operating a firm, intensity of debt or equity option used by the firm to finance its operations represents the firm's capital structure. If the organizations are financing through debt they have to pay the interest to the banks and if they are financing through equity they have to give the dividends to the shareholders from their profit and sometimes generate the retained earnings account that they did not distributed to the shareholders but reflecting their profit (Chan-Jane, Tawei & Chae-Jung, 2015; Nwaobia, Kwarbai, Jayeoba & Ajibade, 2016).

### ***Earning per share***

EPS is a basic yardstick of a company's profitability and is used to tell investors whether the company is a safe bet (Motley, 2020). Earnings per share are one of the most important variables for determining a company's share prices. A high EPS indicates that the company is more profitable and has more profits to distribute to shareholders. EPS is used typically by analysts and traders to gauge the financial strength of a company, and is often considered to be one of the most important variables in determining a stock's value (David, 2020).

Earnings per share (EPS) ratio is computed by:

$$\text{EPS} = \frac{\text{Net Income after Tax}}{\text{Number of Outstanding Shares}}$$

### ***Debt Ratio***

Debt Ratio is a [financial ratio](#) that indicates the percentage of a company's [assets](#) that is provided via [debt](#) (Sari, 2020). It is the ratio of total debt and [total assets](#) (the sum of [current assets](#), [fixed assets](#), and other assets such as [goodwill](#) (Sari, 2020)). Debt ratio is a [solvency ratio](#) that measures a firm's total liabilities as a percentage of its total assets. The debt ratio shows a company's ability to pay off its liabilities with its assets. In other words, this shows how many assets the company must sell in order to pay off all of its liabilities. This ratio measures the [financial leverage](#) of a company. Companies with higher levels of liabilities compared with assets are considered highly leveraged and more risky for lenders. This helps investors and creditors analysis the overall debt burden on the company as well as the firm's ability to pay off the debt in future, uncertain economic times ([Wilkinson](#), 2020).

The debt ratio is shown in decimal format because it calculates total liabilities as a percentage of total assets. As with many solvency ratios, a lower ratios is more favorable than a higher ratio. A company's debt ratio offers a view at how the company is financed. This provides a clear indication of the amount of leverage held by a business. The company could be financed by primarily [debt](#), primarily equity, or an equal combination of both. The debt ratio takes into account both short-term and long-term [assets](#) by applying both in the calculation of the total assets when compared with total debt owed by the company (Bragg, 2020). The debt ratio of a business is used in order to determine how much risk that company has acquired. A low level of risk is preferable, and is linked to a more independent business that does not need to rely heavily on borrowed funds, and is therefore more financially stable. These businesses will have a low debt ratio (below .5 or 50%), indicating that most of their assets are fully owned (financed through the firm's own equity, not debt). A high risk level, with a high debt ratio, means that the business has taken on a large amount of risk. In some instances, a high debt ratio indicates that a business could be in danger if their [creditors](#) were to suddenly insist on the repayment of their loans. This is one reason why a lower debt ratio is usually preferable ([Ramirez](#), 2020). A ratio of 1 means that total liabilities equals total assets. In other words, the company would have to sell off all of its assets in order to pay off its liabilities. Obviously, this is a highly leverage firm. Once its assets are sold off, the business can no longer operate (Tracy, 2020).

$$\text{Debt Ratio} = \frac{\text{Total Debt}}{\text{Total Assets}}$$

### ***Empirical review***

Onwumere, Ibe and Okpara (2011) examined the impact of debt finance on the value of Nigerian firms adopting a bankruptcy model. The study relied on historic accounting data obtained from the financial statements and accounts of 28 quoted firms on the Nigeria Stock Exchange and covered the period 2004-2008. A bankruptcy model, the Multiple Discriminant Analysis (MDA) was used and a benchmark Zscore of 2.675 was established in classifying firms as either having enhanced value or not. The results revealed that while twenty firms had value created as a result of external funds in their financial mix; eight firms did not create value under the same condition. Therefore, the use of debt finance enhances the value of firms. These should be encouraged for firms in developing countries in order that they will meaningfully contribute to their economic growth and development. Arowoshegbe and Emeni (2014) examined the relationship between shareholders' wealth and debt-equity mix of quoted companies in Nigeria. The study was based on a panel data set from 1997 to 2011 comprising sixty non- financial companies. The study specified two panel regression models. Two measures of shareholders' wealth: Return on Equity (ROE) and Earnings per Share (EPS) were taken as the dependent variables respectively. The principal explanatory variable for each of the models was Debt Ratio (DR). The results of the study conform to the a-priori expectation that there is a significant negative relationship between shareholders' wealth and debt-equity mix of quoted companies in Nigeria. Musila (2015) established the relationship between equity financing

and financial performance for firms in the energy and petroleum sector listed at the Nairobi Securities Exchange. The study was descriptive in nature and the research analyzed the data selected within a specified period of time. The population for the study consisted of the five firms in the energy and petroleum sector listed at Nairobi Securities Exchange from the year 2005 to 2014 period. The sample was the same as the population. The study used secondary data from published audited annual reports of accounts for the sample firms and these were obtained from Nairobi Securities Exchange and Capital Market Authority. Financial data from balance sheets, profit and loss accounts and cash flow statements were used to calculate and analyze return on equity which is the dependent variable, while growth opportunities; firm size, liquidity ratio and equity ratio are independent variables. The study used a regression model to analyze the relationship between equity financing and financial performance of the firms. Control variables namely growth opportunities, liquidity ratio, and firm size were used in the regression model. F-test was used to determine the fitness of the regression model in analyzing the relationship. The coefficient of determination was used to explain how much of the variations in financial performance were explained by equity financing. The results of the study showed a non-significant but positive relationship between equity financing and financial performance. The study also showed a significant positive relationship between financial performance and growth opportunities and equity ratio. Abdullah and Naser (2015) identified determinants of capital structure in a sample of commercial banks listed on the Gulf Cooperation Council (GCC) stock markets. To achieve the objective, data about were collected from 47 GCC commercial banks for the period between 2001 and 2010. The study found that profitability and liquidity affect banks' capital structure decision. The major contribution of the study is that, the majority of the commercial banks' assets in GCC is financed by debts which represents more than 80 percent of the capital of the banks. The result emphasized the importance of long-term debts in commercial banks' financing in GCC. Oseifuah and Gyekye (2017) investigated the impact of working capital management efficiency and its separate components on firm value of South African firms listed on the Johannesburg Stock Exchange (JSE). Panel data regression methodology was used to analyze accounting data obtained from I-Net Bridge/BFA McGregor for 75 firms for the 10 year period, 2003 to 2012, to determine the nexus between working capital management and profitability (proxied by return on assets). The key findings of the study were that: there exists a significant positive relationship between firm value and both inventory conversion period and receivables conversion period; the relationship between the cash conversion cycle and firm value is positive but insignificant; there is a significant positive relationship between accounts payable deferral period (PDP) and profitability; firm size and firm value are significantly positively related, and there is a significant negative relationship between leverage and firm value. [Venugopal, Sharma & Ravindar \(2018\)](#) analysed the capital structure impact on shareholder value by considering created shareholder value (CSV) as a shareholder value measure in 77 Indian pharmaceutical firms listed in BSE over a period of 9 years from 2007 to 2015. Using the balanced panel data and regression models, the study found that determinants such as debt–equity ratio, long-term debt ratio and short-term debt ratios have positive correlation with CSV and negatively related to total debt ratio in the absence of tax. Nenu, Vintila and Gherghina (2018) examined the impact of capital structure on risk and firm performance of Romanian market. The study applied multivariate fixed-effects regressions, as well as dynamic panel-data estimations (two-step system generalized method of moments, GMM) on a panel comprising the companies listed on the Bucharest Stock Exchange. The analyzed period, 2000-2016, covers a cycle with significant changes in the Romanian economy. Results showed that leverage is positively correlated with the size of the company and the share price volatility. Islam, Tunku and Ghazalat (2019) investigated the effect of corporate financing decisions on firm value. The research was carried out using the panel data procedure for a sample of 256 firms from 9 sectors listed on Bursa Malaysia during the period 2000-2015. The study used Tobin's Q representing firm value for the dependent variable. The corporate financing was measured by leverage (short-term debt to total assets, long-term debt to total assets, total debt to total assets and total debt to total equity) and debt maturity (long-term debt to total debt). Short-term debt to total assets and long-term debt to total assets has a positive significant relationship to firm value. This finding is consistent with the view that leverage and dividends mitigate agency costs of free cash flow problems, therefore, increasing firm value. Total debt to total assets affects firm value negatively. This proves that although there are benefits of debts, there is also the cost of debts. The cost of debt financing arises from the increase in the probability of bankruptcy. Firm value does not depend on the length of debt maturity. Bannerman and Fu (2019) examined the effects of long term debt on firm growth in China from 2013-2018. Statistical package of social studies version 22 was used to analyze the data and by correlating as well as regression model assisted the study. It was discovered that, long term debt negatively affects firm growth when sizes and maturity remain major considerate option to access long term finance, though not statistically significant as perceived. Zelalem (2020) investigated the effect of financial leverage on the financial performance of Ethiopian Commercial Banks for the period of 10 years (2008-2017) for the 5 selected commercial banks. As a measure of financial leverage for the independent variables three variables such as Debt ratio (DR), Debt Equity ratio (DER) and Interest coverage ratio (ICR) (times interest earned ratio) were used. As a measure of financial performance, two ratios such as return on asset (ROA) and return on equity (ROE) were used. The ex-post facto and longitudinal research design were used. The secondary data were collected from the audited financial reports (profit and loss statement and statement of financial position) of selected commercial banks operated in Ethiopian financial system. Descriptive statistics and Fixed Effect model were used. The result of the study showed that, Debt Ratio (DR) has a negative insignificant effect on Banks' performance measured by Return on Assets (ROA) and Return on Equity (ROE) while Debt Equity Ratio (DER) and Interest Coverage Ratio (ICR) have significant positive Effect on Banks' performance measured by Return on Assets (ROA) and Return on Equity (ROE). Kućera, Vochozka and Rowland (2021) determined the optimal credit absorption capacity of enterprises in Austria The data used were obtained from the Albertina database for the years 2012–2018. The credit absorption capacity of the monitored enterprises ranged from CZK 6.88 million to CZK 9.6 million. The linear regression analysis found a negative relationship between leverage and performance of enterprises.

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## METHODOLOGY

The research design employed in this study is the *ex-post facto* research design. An *Ex-post Facto* research determines the cause-effect relationship among variables. *Ex-post Facto* seeks to find out the factors that are associated with certain occurrence, conditions, events or behaviours by analyzing past events or already existing data for possible casual factors (Kothari & Garg 2014).

The population of this study comprised all the fifty-nine (59) listed manufacturing companies in Nigeria as at 31<sup>st</sup> December, 2020 (Nigerian Exchange Group, 2021).

Purposive sampling technique was adopted in the determination of the sample size based on the availability and up-to-date annual financial statements; listed manufacturing companies that have consistently submitted their annual reports to the Nigerian Exchange Group (NGX) from 2010 to 2020. In view of this, twenty one (21) listed manufacturing companies served as the sample size of this study.

Essentially, this study utilised secondary data that were extracted from the annual reports and statements of account of the sample listed manufacturing companies.

### **Data Analysis Technique**

The analysis of data for this study was done based on the secondary financial data obtained from publications of the Nigerian Exchange (NGX) Group and the annual reports and accounts of the listed manufacturing firms in Nigeria covering 2010-2020. The sample entails a balanced panel data of 210 firm-year observations, related to 21 different firms, during the eleven (11) years (2010-2020) period. Descriptive statistics was used to summarise the mean, median, standard deviation, skewness, kurtosis, maximum and minimum of the variables. Inferential statistical analysis was carried out with the aid of E-Views 10.0 statistical software. These include the following:

Panel Least Square (PLS) regression analysis: was used to predict the value of a variable based on the value of the other variables;

Hausman Specification Test: was used to differentiate between [fixed effects model](#) and [random effects model](#) in the [panel analysis](#).

The dataset comprised time series attributes (2010-2020). The cross-sectional attributes of the data were represented by a sample of twenty-one (21) manufacturing firms in Nigeria. In view of the panel nature of the dataset, it was further analysed using Fixed Effect (FE) and Random Effect (RE) regression technique.

### **Model Specification**

This study adapted the model of Agung and Andi (2019):

$$ROE = \beta_0 + \beta_1 DER + \beta_2 TLR + \beta_3 CDR + \xi$$

Where:

ROE : Return on Equity

DER = Debt-to-Equity Ratio

TLR : Total Liability Ratio

CDR : Cash Flow to Debt Ratio

$\xi$  : Error Term

The following models were employed to estimate the relationship between the discrete components of debt ratio and earnings per share. Hence, the composite multiple regression equation is:

$$EPS_{it} = \beta_0 + \beta_1 DR_{it} + \beta_2 FSZ_{it} + \mu_{it}$$

**Where:**

$\beta_0$  = Constant term (intercept)

$\beta_1, \beta_2$  = Regression co-efficient

$\beta_1$  = slope (coefficient or parameter estimate) of DR

$\mu_{it}$  = idiosyncratic error (unobservable factors) that vary over time and affect shareholders' wealth creation

$i$  = individual firms (1,2,3,... 21)

$t$  = time periods (1,2,3,... 11)

$EPS_{it}$  = Earnings per Share of firm  $i$  in period  $t$

$DR_{it}$  = Debt Ratio of firm  $i$  in period  $t$

$FSZ_{it}$  = Firm Size of firm  $i$  in period  $t$

**Decision Rule**

Reject  $H_0$  if the P-value of the test is less than  $\alpha$ -value (level of significance) at 5%, otherwise accept  $H_1$ .

**DATA ANALYSIS****Table 1 Descriptive Statistics**

	EPS	DR	FSZ
Mean	1.0362	11.0185	10.1831
Median	1.0100	11.1600	10.3100
Maximum	1.4100	12.1100	10.5400
Minimum	0.5500	9.8800	9.5700
Std. Dev.	0.2659	0.8360	0.2922
Skewness	0.2480	-0.1624	-0.6422
Kurtosis	2.0801	1.4424	2.3442
Jarque-Bera	9.5916	1.3713	11.1265
Probability	0.0089	0.5038	0.0004
Sum	13.4700	143.2400	132.3800
Sum Sq. Dev.	0.8487	8.3872	1.0249
Observations	13	13	13

Source: E-Views 10 Descriptive Output, 2021

**Interpretation**

Table 1 presents the descriptive statistics for the different variables of the study with an observation of 231 (13banks x 11 years). Mean is the most commonly used measure of central tendency. The standard deviations show the deviation/dispersion/variation from the mean. It is a measure of risk, the higher the standard deviation, the higher the risk. The standard deviation is a measure that summarises the amount by which every value within a dataset varies from the mean. It is the most robust and widely used measure of dispersion. skewness is the measure of how much the probability distribution of a random variable deviates from the [normal distribution](#). Table 1 delineates that the probability distribution for EPS (0.2480) is a positively skewed distribution, while the probability distribution for DR (-0.1624); and FSZ (-0.6422) is a negatively skewed distribution.

**Test of Hypothesis**

**$H_0$ :** Debt Ratio has no significant effect on Earnings Per Share of quoted manufacturing firms in Nigeria.

**$H_1$ :** Debt Ratio has significant effect on Earnings Per Share of quoted manufacturing firms in Nigeria.

**Table 2: Panel Least Square Regression Analysis testing the effect of DR on EPS**

Dependent Variable: EPS

Method: Panel Least Squares

Date: 08/16/21 Time: 18:22

Sample: 2010 2020

Periods included: 11

Cross-sections included: 21

Total panel (balanced) observations: 231

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.157685	0.416738	17.17551	0.0000
DR	0.256515	0.040637	6.312408	0.0000
FSZ	0.031146	0.057263	0.543909	0.5870
R-squared	0.036115	Mean dependent var		1.004610
Adjusted R-squared	0.005859	S.D. dependent var		0.493791
S.E. of regression	0.492342	Akaike info criterion		1.454733
Sum squared resid	54.05543	Schwarz criterion		1.573951
Log likelihood	-160.0217	Hannan-Quinn criter.		1.502818

F-statistic	57.13642	Durbin-Watson stat	1.626982
Prob(F-statistic)	0.000000		

Source: Researcher's computation using E-Views 10.0, 2021

### Interpretation of Regression Analysis

The panel regression result in Table 4.5 shows that the sign of the beta coefficients of DR ( $\beta_1 = 0.0012085$ ); FSZ ( $\beta_7 = 0.031146$ ) indicate the presence of a positive association between DR and EPS of manufacturing firms under review period. The t-statistics with their probabilities associated with the coefficients indicate that, at 5% (0.05) level of significance, DR ( $x_1 = 0.0000 < 0.05$ ) has a positive and statistically significant relationship with EPS.

$$\text{EPS} = 7.157685 + 0.256515\text{DR} + 0.031146 \text{FSZ}$$

Results of the analysis show that the explanatory variable included in the model explains about 60.59% variations in the explained variable. This implies that within the context of the model, DR and FSZ explained about 60.59% variability in EPS during the study period.

### Decision

This study therefore submits that there is a significant relationship between debt ratio and earnings per share of manufacturing firms in Nigeria at 5% significant level.

**Table 3: Hausman Specification Test between DR, FSZ and EPS**

Correlated Random Effects - Hausman Test			
Equation: Untitled			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	18.967263	7	0.0011

Source: Researcher's computation using E-Views 10.0, 2021

### Interpretation

Hausman test rule:

**H<sub>0</sub>:** If the  $p$  value  $> \alpha = 0.05$  then the variable does not have a significant effect (Accept Random Effects Model).

**H<sub>1</sub>:** If the  $p$  value  $< \alpha = 0.05$  then the variable has a significant effect (Accept Fixed Effects Model)

Consequent upon the results in table 3, Fixed Effect Model is preferred to Random Effects Model at a p-value of 0.0011 which is less than 0.05, implying that debt finance components has a significant effect on earnings per share at 5% level of significance.

## CONCLUSION

This study examined the effect of debt ratio on earnings per share of quoted manufacturing firms in Nigeria for a period of eleven (11) years covering from 2010-2020. Data analysis revealed that a positive relationship exists between debt ratio and earnings per share. In conclusion, this study found that debt ratio has a significant effect on earnings per share at 5% level of significance.

Based on the finding, the policy recommendations was that based on the positive relationship between debt and earnings per share study recommends that, firms should leverage on the amount of debt opportunities available to enable them finance their undertakings, as it enhances firms' bottom line. Also, those firms should operate with a capital structure mix that would minimize the cost of capital and maximize shareholders' wealth via increased earnings.

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